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(54) IMAGE NOISE REDUCING METHOD AND DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To resolve a problem of an equalized signal phase shifting from an original position.

SOLUTION: For example, level values a to h of peripheral picture elements and a level value o of a target picture element are respectively inputted in eight comparators 11, and when the absolute value of the difference between the level values is smaller than a reference level θ, a value of '1' is outputted. Peripheral picture elements in point symmetrical positions with the target picture element o in the center are combined and signals from the comparators 11 are supplied to four AND circuits 12 in accordance with combinations. Signals from the AND circuits 12 are supplied to eight AND gates 13 in accordance with respective combinations, and when a signal from an AND circuit 12 is a value of '1', the level value a to h of a corresponding peripheral picture element is

outputted to an output port 3 through the AND gate 13. The signal from the AND circuit 12 is supplied to an adder 14, the summed output is doubled at a multiplier 15, the multiplied output is added with a value of '1' at an adder 16, and it is outputted to an output port 4.

CLAIMS

[Claim(s)]
[Claim 1]It is an image noise reducing method which reduces a noise component by detecting a level difference of a noticed picture element and its peripheral pixel, choosing only a pixel in which said level difference is smaller than a reference value, and calculating equalization, An image noise reducing method, wherein the both calculate said equalization only using said both selected pixels combining a pixel of a position of point symmetry centering on said noticed picture element.
[Claim 2]An image noise reducing method making the range of said peripheral pixel into 3x3, 5x5, or a range beyond it in the image noise reducing method according to claim 1.
[Claim 3]It is an image noise reduction device which is provided with the following and reduces a noise component, An image noise reduction device forming a means which takes out only a pixel as which both the both were chosen combining a pixel of a position of point symmetry centering on said noticed picture element, and calculating equalization by said calculating means only using a pixel by which picking appearance was carried out [aforementioned].
A detection means to detect a level difference of a noticed picture element and its peripheral pixel.
A selecting means which chooses only a pixel in which said level difference is smaller than a reference value.
A calculating means which calculates equalization using said selected pixel.

[Claim 4]An image noise reduction device making the range of said peripheral pixel into 3x3, 5x5, or a range beyond it in the image noise reduction device according to claim 3.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention is used when digitizing and processing a picture signal, for example, and it relates to a suitable image noise reducing method and device. In detail, the fault in the case of reducing the noise component of a picture signal using what is called an epsilon-filter is canceled.

[0002]

[Description of the Prior Art]For example, as a means to reduce the noise component contained in a picture signal, various methods are proposed from the former. Especially, it is the easiest and one of the big methods of a noise reduction effect has a method by a low pass filter (below Low Pass Filter : calls it LPF for short). This LPF is a device which transmits only the signal of an ingredient lower than a certain reference frequency. That is, if the signal with which frequency changes to this LPF is inputted and the amplitude of an output signal is observed, the characteristic that a level becomes low is shown as an ingredient with high frequency.

[0003]On the other hand, if another view is carried out, such LPF will have the average value of the pixel which adjoins the circumference of a noticed picture element and a noticed picture element, and will be taken as the new value of a noticed picture element. That is, in this method, even if it equalizes the signal level of surrounding picture elements and the strong noticed picture element of correlation, the big change to that value is not produced, but by being equalized with the noise component contained in surrounding picture elements, the random noise component without correlation brings that value close to "0", and goes.

[0004]Therefore, when such LPF is used, a noise depressing effect becomes large, so that the search area of surrounding picture elements is large. However, equalization operation with the surrounding picture elements by such LPF is reduced, for example like [the edge information of a picture] a noise, and as a result, the whole picture of what decreasing [a noise's] becomes what faded, and also produces the demerit on which image quality is dropped. For this reason, LPF as a noise reducing means is seldom generally used.

[0005]What is called an epsilon-filter is advocated as a method of canceling the fault of

such LPF (refer to Arakawa scent "nonlinear digital filter and its application" in Institute of Electronics, Information and Communication Engineers Vol.77 No.8 pp.844-852 August, 1994). That is, in epsilon-filter advocated by this literature, when carrying out equalization operation with a noticed picture element and surrounding picture elements, it is judged whether those applicable surrounding picture elements have a noticed picture element and correlation first.

[0006]Certain reference level theta is set up, if the level of applicable surrounding picture elements is contained within the limits of **theta of the level of a noticed picture element, it will specifically include in an equalization element, and when not entering within the limits of **theta, it is not considered as an equalization element. Thus, after searching for whether it includes in an equalization element to all the surrounding picture elements, or it does not put in, the new value of a noticed picture element is calculated by an equalization operation with a noticed picture element by making into an arithmetic object only the surrounding picture elements incorporated as an equalization element.

[0007]Therefore, if the level of the pixel which constitutes edge is over the range of **theta of the level of a noticed picture element even when image edge enters in search area temporarily, a picture will not become blunt by including in equalization the pixel which does not serve as an arithmetic object of equalization, for example, constitutes edge. That is, according to this epsilon-filter, the image edge can oppress only a noise component as it is by choosing the value of reference level theta appropriately.

[0008]Furthermore, the actual circuitry of epsilon-filter is explained using drawing 5. In drawing 5, the figure 1 shows one with image area, and imagines the situation of the noticed picture element o, its surrounding picture elements a, b, and c, d, e, f, g, and h. And if the respectively same notation as numerals a-h and o is substituted for the level value of these pixels, the level values a-h of these surrounding picture elements will be supplied to the selection circuitry 2. The value of above-mentioned reference level theta and level value [of a noticed picture element] o are inputted into this selection circuitry 2.

[0009]By this selection circuitry 2, the absolute value (|a-o|) of the difference of level value a of the surrounding picture elements a and level value o of the noticed picture element o is calculated first, and the absolute value of this difference is compared with reference level theta. And if the absolute value of an above-mentioned difference is smaller than the value of reference level theta, level value a will be outputted to the output port 3. When the absolute value of a difference is larger than the value of reference level theta, level value a is not outputted to the output port 3, but a value "0" is outputted. Calculation with the same said of level value b-h of surrounding-picture-elements b-h of further others is performed.

[0010]Therefore, it is the same as the number of surrounding picture elements to this selection circuitry 2, for example, the eight output ports 3 are established in it, When the

absolute value of an above-mentioned difference is smaller than the value of reference level theta in these output ports 3 respectively, the level value a-h is outputted to them, and a value "0" is outputted when the absolute value of a difference is larger than the value of reference level theta. The output port 4 is established in the selection circuitry 2, and the value which added the value "1" to the number of the output ports 3 where above-mentioned level value a-h is outputted is outputted to this output port 4.

[0011]That is, from the selection circuitry 2, the absolute value of the difference of a noticed picture element and surrounding picture elements is outputted, altogether, when smaller than the value of reference level theta, each level value a-h is outputted from the output port 3, for example, and a value "9" is outputted to the output port 4. When larger than the value of reference level theta, from [all / all] the output port 3, a value "0" is outputted, for example for the absolute value of the difference of a noticed picture element and surrounding picture elements, and a value "1" is outputted to the output port 4.

[0012]And level value o of the output from the output port 3 of this selection circuitry 2 and the noticed picture element o is supplied to the adding machine 5, and the value taken out by the output port 6 of this adding machine 5 is supplied to the divider 7. The value from the output port 4 of the above-mentioned selection circuitry 2 is supplied to the divider 7. And in this divider 7, division process of the value from the output port 6 of the adding machine 5 is carried out with the value from the output port 4 of the selection circuitry 2, and the value of that result of an operation is taken out by the output port 8.

[0013]If certain reference level theta was set to the output port 8 and the level of applicable surrounding picture elements is contained within the limits of **theta of the level of a noticed picture element by this, it will include in an equalization element, When not entering within the limits of **theta, after searching for whether it includes in an equalization element to all the surrounding picture elements by not considering it as an equalization element, or it does not put in, The new value of the noticed picture element for which it asked by an equalization operation with a noticed picture element is taken out by making into an arithmetic object only the surrounding picture elements incorporated as an equalization element.

[0014]It seems that the concrete circuitry of the selection circuitry 2 is shown, for example in drawing 6 in an above-mentioned device. That is, in drawing 6, it is the same as the number of above-mentioned surrounding picture elements, for example, the eight comparators 20 are formed. The level values a-h of above-mentioned surrounding picture elements, level value o of a noticed picture element, and the value of reference level theta are inputted into these comparators 20, respectively. And from each comparator 20, when the absolute value of the difference of the level value of surrounding picture elements and a noticed picture element is smaller than the value of reference level theta, a value "1" is outputted.

[0015]Furthermore, the signal from these comparators 20 is supplied to AND gate 21, respectively. Level value a-h of surrounding picture elements is supplied to AND gate 21, respectively, and when the signal from the above-mentioned comparator 20 is a value "1", level value a-h of surrounding picture elements is outputted to the output port 3 through AND gate 21. The signal from the comparator 20 is supplied to the adding machine 22. Furthermore, the added output of this adding machine 22 is supplied to the adding machine 23, a value "1" is added, and it is outputted to the output port 4.

[0016]In this circuitry, level value a-h of the surrounding picture elements whose absolute value of the difference of level value a-h and level value o of a noticed picture element is smaller than the value of reference level theta is outputted to the output port 3 by this through AND gate 21. A value "0" is outputted when the absolute value of a difference is larger than the value of reference level theta. Furthermore, the value which added the value "1" to the number with which level value a-h is outputted to the output port 3 through above-mentioned AND gate 21 is outputted to the output port 4.

[0017]Thus, from the selection circuitry 2, the value which added the value "1" to the number with which above-mentioned level value a-h whose absolute value is smaller than the value of reference level theta and this level value a-h of the difference are outputted is outputted. And by adding such level value a-h and level value o of a noticed picture element, and breaking this aggregate value by the value which added the value "1" to the number with which level value a-h is outputted, The equalization operation which made the arithmetic object only the pixel made into the equalization element is performed, and the new value which is a noticed picture element is taken out.

[0018]

[Problem(s) to be Solved by the Invention]Thus, in above-mentioned epsilon-filter, a noise can be reduced effectively, with image edge saved. However, the area of equalization of a noticed picture element is moved by the position of the pixel made into the equalization element in this case, and the phenomenon in which the signal phase which should also be called center of gravity of a pixel for this reason will shift from the position of a noticed picture element arises. For example, if the pixel included in an equalization element has deviation, the equalized signal phase will take the lead in those pixels, and will shift from the position of a noticed picture element.

[0019]That is, the signal phase of the pixel by which the pixel included in an equalization element as shown, for example in A of drawing 7 was equalized only in the right-hand side pixel b, c, and e, g, and h will take the 6-pixel lead (halfway point of the pixels e and o) including the pixel o, as - shows, and it will shift from the position of the noticed picture element o. In B-D of drawing 7, - comes to show the signal phase of the pixel equalized, respectively, and it shifts from the position of the original noticed picture element o to it.

[0020]To the image edge containing an intermediate level as shown, for example in A of drawing 8, operation becomes unstable and there is a possibility that edge may be

disturbed. Namely, when the position of this intermediate level has a noticed picture element, this noticed picture element is derived to one of the levels of the nearer one, but. The absolute value of the difference of this intermediate level and the level of the pixel before and behind edge is in the value of reference level theta in **, the direction derived by slight change of an intermediate level is reversed, and, sometimes, there is a possibility that edge may be disturbed as shown in B of drawing 8.

[0021]That is, for example, in A of drawing 8, if the noticed picture element in the position of an intermediate level is judged to be close to black, equalization will be performed by six pixels which contain three black pixels, for example like A of drawing 7, and a signal phase will be moved to the 0.5-pixel right. On the other hand, if a noticed picture element is judged to be close to white, equalization will be performed by six pixels which contain three white pixels contrary to ****, and a signal phase will be moved to the 0.5-pixel left. Thus, a signal phase is moved to right and left by slight change of an intermediate level.

[0022]And if it generates in the sequence which are linear pixels with arbitrary movement to the right and left of such a signal phase, as shown, for example in B of drawing 8, image edge will be disturbed, and original edge will appear on a screen as a different noise. Generating the disorder of such image edge also in not only vertical edge like a graphic display but level edge, or slanting edge, the edge of original [case / any] appears on a screen as a different noise.

[0023]The problem which is going to accomplish this application in view of such a point, and it is going to solve, If the pixel included in an equalization element in what is called an epsilon-filter has deviation in the conventional device, Problems, such as disorder of the image edge which the equalized signal phase may shift from the position of an original noticed picture element, and is generated by this, were not able to be solved.

[0024]

[Means for Solving the Problem]For this reason, as equalization is calculated in this invention only using a pixel as which both those both were chosen combining a pixel of a position of point symmetry centering on a noticed picture element, according to this. Fear, such as disorder of image edge which an equalized signal phase does not shift from a position of an original noticed picture element, and is generated, is also cancelable.

[0025]

[Embodiment of the Invention]Namely, this invention detects the level difference of a noticed picture element and its peripheral pixel, By choosing only the pixel whose level difference is smaller than a reference value, and calculating equalization, it is an image noise reducing method which reduces a noise component, and equalization is calculated only using the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element.

[0026]A detection means by which this invention detects the level difference of a noticed picture element and its peripheral pixel, It has a selecting means which chooses only the pixel whose level difference is smaller than a reference value, and a calculating means which calculates equalization using the selected pixel, It is an image noise reduction device which reduces a noise component, the means which takes out only the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element is formed, and the equalization by a calculating means is calculated only using the taken-out pixel.

[0027]Hereafter, it is a block diagram showing the composition of one embodiment of the selection circuitry 2 used by the image noise reducing method and device with which drawing 1 applied this invention with reference to drawings explaining this invention. That is, in this invention, the composition of the whole device is the same as the composition shown by drawing 5 of the Prior art. And in this invention, the problem of the conventional epsilon-filter mentioned above is solved by adding improvement about the selection circuitry 2 shown in drawing 6.

[0028]In drawing 1, for example, it is the same as the number of surrounding picture elements like above-mentioned drawing 6, the eight comparators 11 are formed and level value a-h of above-mentioned surrounding picture elements, level value o of a noticed picture element, and the value of reference level theta are inputted into these comparators 11, respectively. And from each comparator 11, when the absolute value of the difference of the level value of surrounding picture elements and a noticed picture element is smaller than the value of reference level theta, a value "1" is outputted. This composition is equivalent to the conventional comparator 20.

[0029]The pixel of the position of the point symmetry centering on the noticed picture element o is combined about the further above-mentioned surrounding picture elements a-h. That is, the surrounding picture elements a and h, b, g and c, f and d, and e are combined. And according to such combination, the signal from the comparator 11 is supplied to four AND circuits 12. From AND circuit 12, simultaneously, when the absolute value of the difference of a level value with a noticed picture element is smaller than the value of reference level theta, a value "1" is outputted for the pixel of combination by this, respectively.

[0030]And the signal from these AND circuits 12 is supplied to eight AND gates 13 according to an above-mentioned combination, respectively. Level value a-h of surrounding picture elements is supplied to AND gate 13, respectively, and when the signal from above-mentioned AND circuit 12 is a value "1", level value a-h of surrounding picture elements is outputted to the output port 3 through AND gate 13. The composition of these AND gates 13 is equivalent to conventional AND gate 21.

[0031]The signal from AND circuit 12 is supplied to the adding machine 14. Furthermore, the added output of this adding machine 14 is supplied to the multiplier 15, and it doubles it. And the multiplication output of this multiplier 15 is supplied to the

adding machine 16, a value "1" is added, and it is outputted to the output port 4. That is, since the signal from AND circuit 12 represents the signal from the comparator 11 to two surrounding picture elements put together in this case, respectively, it is considered as an original value by doubling with the multiplier 15.

[0032]In this circuitry, by this, in the output port 3. About the surrounding picture elements which combined the position of the point symmetry centering on the noticed picture element o, level value a-h of surrounding picture elements smaller than both the values of reference level theta is outputted for the absolute value of the difference of level value a-h and level value o of a noticed picture element through AND gate 13. The value which added the value "1" to the number with which level value a-h is outputted to the output port 3 through above-mentioned AND gate 13 is outputted to the output port 4.

[0033]Thus, from the selection circuitry 2, the value which added the value "1" to level value a-h whose absolute value of an above-mentioned difference is smaller than the value of reference level theta, and the number with which these level values a-h are outputted is outputted. And by adding such level value a-h and level value o of a noticed picture element, and breaking this aggregate value by the value which added the value "1" to the number with which level value a-h is outputted, The equalization operation which made the arithmetic object only the pixel made into the equalization element is performed, and the new value which is a noticed picture element is taken out.

[0034]And level value a-h of the surrounding picture elements outputted from the selection circuitry 2 in this case, The signal phase equalized when the pixel of the position of the point symmetry centering on the noticed picture element o was always put together, therefore an equalization operation was performed does not shift from the position of an original noticed picture element, and it becomes what was always in agreement with the position of a noticed picture element. A possibility that edge may be disturbed by this in image edge like drawing 8 shown, for example by the Prior art is cancelable.

[0035]Namely, for example in image edge like A of drawing 8, even if the noticed picture element in the position of an intermediate level is judged to be close to any of white/black, Only one pixel of point symmetry will not be included in an equalization element, and only the surrounding picture elements of an up-and-down intermediate level will be included in an equalization element here. Therefore, a signal phase is not moved to right and left by slight change of an intermediate level, the image edge of A of drawing 8 is outputted as it is, and disorder of image edge like B of drawing 8 is canceled.

[0036]When only one point of the noticed picture element o as shown, for example in drawing 2 is carrying out level fluctuation according to this invention, when the absolute value of the difference of level value o of this noticed picture element and level value a-h of surrounding picture elements is smaller than the value of reference level

theta, The level value of this noticed picture element o is equalized, and a noise is reduced. When the absolute value of the difference of level value o of a noticed picture element and the level values a-h of surrounding picture elements is larger than the value of reference level theta, it is saved as a right level value.

[0037]Therefore, by having been made to calculate equalization in the above-mentioned embodiment only using the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element, Fear, such as disorder of the image edge which the equalized signal phase does not shift from the position of an original noticed picture element, and is generated, is also cancelable.

[0038]If the pixel included in an equalization element in what is called an epsilon-filter in the conventional device by this has deviation, The equalized signal phase may shift from the position of an original noticed picture element, and according to this invention for what was not able to solve problems, such as disorder of the image edge generated by this, these problems are easily cancelable.

[0039]Furthermore, according to this invention, since there is no possibility that deviation may arise in the pixel included in an equalization element and a possibility that the problem which shifts from the position of an original noticed picture element may arise does not have the signal phase equalized by it, either, the range of search of surrounding picture elements can be made into the wider range. That is, although 3x3 pixels was searched at the above-mentioned embodiment, it is also possible to make this into 5x5 pixels as shown in drawing 3, and the pixel number beyond it.

[0040]Therefore, for example, when searching to 5x5 pixels as shown in drawing 3, in the selection circuitry 2 as shown, for example in drawing 4, level value o of a noticed picture element, level value a-y (o removes) of surrounding picture elements, and the value of reference level theta are inputted into the 24 comparators 41. And from each comparator 41, when the absolute value of the difference of the level value of surrounding picture elements and a noticed picture element is smaller than the value of reference level theta, a value "1" is outputted. This composition expands composition equivalent to the conventional comparator 20.

[0041]The pixel of the position of the point symmetry centering on the noticed picture element o is combined about the further above-mentioned surrounding picture elements a-y (o removes). namely, the surrounding picture elements a and y, b, x and c, and w ... is combined. And according to such combination, the signal from the comparator 41 is supplied to 12 AND circuits 42. From AND circuit 42, simultaneously, when the absolute value of the difference of a level value with a noticed picture element is smaller than the value of reference level theta, a value "1" is outputted for the pixel of combination by this, respectively.

[0042]And the signal from these AND circuits 42 is supplied to 24 AND gates 43 according to an above-mentioned combination, respectively. Level value a-y (o removes) of surrounding picture elements is supplied to AND gate 43, respectively, and

when the signal from above-mentioned AND circuit 42 is a value "1", level value a-y (o removes) of surrounding picture elements is outputted to the output port 3 through AND gate 43. The composition of these AND gates 43 expands composition equivalent to conventional AND gate 21.

[0043]Although not illustrated, the signal from AND circuit 42 is supplied to an adding machine, and it doubles this added output with a multiplier. And the multiplication output of this multiplier is supplied to an adding machine, a value "1" is added, and it is outputted to the output port 4. That is, since the signal from AND circuit 42 represents the signal from the comparator 41 to two surrounding picture elements put together in this case, respectively, it is considered as an original value by doubling with a multiplier.

[0044]Thus, from the selection circuitry 2, the value which added the value "1" to level value a-y (o removes) whose absolute value of an above-mentioned difference is smaller than the value of reference level theta, and the number with which this level value is outputted is outputted. And by adding such level values and level value o of a noticed picture element, and breaking this aggregate value by the value which added the value "1" to the number with which the level value is outputted, the equalization operation which made the arithmetic object only the pixel made into the equalization element is performed, and the new value which is a noticed picture element is taken out.

[0045]In this way, by having been made to calculate equalization also in this embodiment only using the pixel as which both those both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element, Fear, such as disorder of the image edge which the equalized signal phase does not shift from the position of an original noticed picture element, and is generated, is also cancelable. This composition can respond only by expansion of a circuit as it is, also when making it into a search range of 7x7 pixels or more.

[0046]That is, when the noise depressing effect of epsilon-filter is demonstrated from the first to the maximum extent, as shown in drawing 7, when the equalization element has decreased, a noise depressing effect is also small [it is a time of performing a flat picture and all the equalization operations of the pixels / in / it is got blocked, for example, / drawing 2 / a-h, and]. So, by such a picture, even if it turns off the operation of epsilon-filter itself, the degree of incidence to a picture is small.

[0047]Therefore, although processing is performed towards reducing equalization elements in this invention, When the above image edge has entered in area, it is a time of the effect by equalization falling from the first, and degradation of a picture cannot progress by this invention, edge can be saved in a natural form, and, on the other hand, a noise depressing effect can be demonstrated by a flat picture to the maximum extent.

[0048]In this way, according to the above-mentioned image noise reducing method, the level difference of a noticed picture element and its peripheral pixel is detected, It is an image noise reducing method which reduces a noise component by choosing only the pixel whose level difference is smaller than a reference value, and calculating

equalization, By calculating equalization only using the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element, Fear, such as disorder of the image edge which the equalized signal phase does not shift from the position of an original noticed picture element, and is generated, is also cancelable.

[0049]A detection means to detect the level difference of a noticed picture element and its peripheral pixel according to the above-mentioned image noise reduction device, It has a selecting means which chooses only the pixel whose level difference is smaller than a reference value, and a calculating means which calculates equalization using the selected pixel, Are an image noise reduction device which reduces a noise component, and the means which takes out only the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element is formed, By calculating the equalization by a calculating means only using the taken-out pixel, fear, such as disorder of the image edge which the equalized signal phase does not shift from the position of an original noticed picture element, and is generated, is also cancelable.

[0050]This invention is not limited to the described above-mentioned embodiment, and the various modification of it is made possible, without deviating from the pneuma of this invention.

[0051]

[Effect of the Invention]Therefore, by having been made to calculate equalization only using the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element according to the invention of claim 1, Fear, such as disorder of the image edge which the equalized signal phase does not shift from the position of an original noticed picture element, and is generated, is also cancelable.

[0052]According to the invention of claim 2, the range of search of surrounding picture elements can be made into the wider range by making the range of a peripheral pixel into 3x3, 5x5, or the range beyond it.

[0053]By furthermore having been made to calculate equalization only using the pixel as which both the both were chosen combining the pixel of the position of the point symmetry centering on a noticed picture element according to the invention of claim 3, Fear, such as disorder of the image edge which the equalized signal phase does not shift from the position of an original noticed picture element, and is generated, is also cancelable.

[0054]According to the invention of claim 4, the range of search of surrounding picture elements can be made into the wider range by making the range of a peripheral pixel into 3x3, 5x5, or the range beyond it.

[0055]If the pixel included in an equalization element in what is called an epsilon-filter in the conventional device by this has deviation, The equalized signal phase may shift

from the position of an original noticed picture element, and according to this invention for what was not able to solve problems, such as disorder of the image edge generated by this, these problems are easily cancelable.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a block diagram showing the composition of one embodiment of the selection circuitry used for the image noise reducing method and device which applied this invention.

[Drawing 2]It is a figure for explanation of the operation.

[Drawing 3]It is a figure for explanation of other embodiments of this invention.

[Drawing 4]It is a block diagram showing the composition of other embodiments of the selection circuitry used for the image noise reducing method and device which applied this invention.

[Drawing 5]It is a lineblock diagram for explanation of the device with which the image noise reducing method of this invention and a device are applied.

[Drawing 6]It is a block diagram showing the composition of the selection circuitry used for a conventional image noise reducing method and device.

[Drawing 7]It is a figure for the explanation.

[Drawing 8]It is a figure for the explanation.

[Description of Notations]

2 [-- An AND circuit, 13 / -- An AND gate, 14 16 / -- An adding machine, 15 / -- Multiplier] -- A selection circuitry, 3, 4 -- An output port, 11 -- A comparator, 12